

Descriptions of the Larvae of Four Species of Lucanidae (Stag Beetle)

by

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Introduction

Systematic observations of the feeding behaviour of Lyrebirds and other animals in their natural environment led the author to examine the various forms of forest-floor fauna consumed by such animals. Among the fauna were several specimens of mature Coleoptera (beetles) and Coleoptera larvae which were collected. In this paper descriptions of the larvae of four species, *Lamprima varians* Germer., *Lissapterus howittanus* Westw., *Lissotes furcicornis* Westw., and *Syndesus cornutus* Fab. are given. The descriptions are based on characters after Hayes (1928), Böving (1930), and Peterson (1951). A shadograph was used to examine specimens soon after the final instar moult and specimens with similar characters were placed into corresponding groups. Ten specimens of each group were killed with Peterson's "KAA" and preserved in 90% alcohol; several specimens were allowed to complete their life-cycles. Each of the live specimens was placed in a glass container with material from the collection site. The containers were then covered with black plastic film to exclude light and at regular intervals the plastic was removed to allow maintenance and inspection of larval development. Many differences in the general shape and colour of all species were noticed and an account of these together with the life histories and habits of adults is in preparation. The species selected to represent the family on Plate I is *Lissapterus howittanus*.

General description of mature larvae

The four species are C-shaped, near-white, variable in body length within species on the dorsal aspect. *Lamprima varians* Germer., ranges from 53 to 70 mm, *Lissapterus howittanus* Westw., from 50 to 92 mm, *Lissotes furcicornis* Westw., from 35 to 44 mm, and *Syndesus cornutus* Fab., from 25 to 44 mm. Both *Lissapterus howittanus* and *Lissotes furcicornis* were found to be somewhat thicker posteriorly between abdominal segments 5-9 and *Lamprima varians* and *Syndesus cornutus* are tapered, more elongate in shape. Each species has 10 abdominal segments, with C-shaped cribriform spiracles visible on the prothorax and abdominal segments 1-8. The anal segment has a vertical anal opening and lobes on the caudal aspect (Fig. 1). The head (Figs. 2 and 2a), orange to pale yellow, slightly smaller than the prothorax, with a few setae, and distinct epicranial suture surrounding the frons. Clypeus short, wider than long, brown on the upper half and creamy white on the lower half. Labrum brown, V-shaped, rounded and setaceous on the apical margin. Antennae are distinct, geniculate, three-segmented, situated near the base of the mandibles (Fig. 3) which are black, asymmetrical, with the left mandible having a molar and four distinct terminal teeth on the mesal aspect. Each

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maxilla (Fig. 4) consists of a two-segmented cardo, stipes, palpifer and a four-segmented palpus, galea and lacinia. The galea and lacinia each terminate with a strong pigmented spur. The labial palpi are two-segmented. The three thoracic segments each carry a pair of four-segmented setaceous legs, subequal in size (Fig. 5). Stridulating organs are present on the first and second segments of the mesothoracic and metathoracic legs respectively. Numerous short, stout setae (resembling asperites) and fewer longer setae occur transversely, on the dorsa of abdominal segments 1-6 and caudolateral portions of the 9th. *Lamprina varians* has fewer longer setae and more numerous asperite-like setae on the dorsal and lateral surface of all segments. *Lissotes furcicornis* has ocelli at the side of antennae.

Different characters were found in the epipharynges (underside of labrum); antennae; tarsungulus (terminal segment of legs); anal segments; and stridulatory organs.

EPIPHARYNGES

In the four species the epipharynges are roughly wedge-shaped, setaceous and rounded on the apical margin with a broad shallow callus (sometimes lightly pigmented) situated on the middle of the distal sensory area. Paria usually covered with setae which become fewer and smaller, laterally. The laetorma and dextortorma are fused, with an annulus of very small, truncated, asperite-like spines, extending from the torma to the distal sensory area. Pedium slightly concave, with a mesal anterior projection situated on the torma, extending into the spinose annulus. The proximal sensory area consists of a medial sense cone conjoined to the torma, basally, immediately behind the anterior projection and another sense cone proximad to this with a chitinized plate on each side. A pternotorma is present.

(a) *Lamprina varians* (Fig. 6). Mesal anterior projection is short and broad. Distal sensory area has an anterior, transverse, medial row of six truncated spines and an inner row consisting of 3-4 asperites. Pternotorma short.

(b) *Lissapterus howittanus* (Fig. 7). More rounded at the apex than the other three species with the lateral-anterior portion of the margin angulate and the mesal aspect of the lateral margin pointed. Mesal anterior projection extends to about the middle of the annulus. Distal sensory area has a transverse anterior row of six fine, long, spines and two additional rows proximad to these, each consisting of two spines. A dense patch of asperites occurs on the anterior portion of the spinose annulus. Pternotorma deep-keeled.

(c) *Lissotes furcicornis* (Fig. 8). Mesal anterior projection extends to about the middle of the annulus. Distal sensory area consists of a patch of eight asperites which appear to be in pairs, irregularly placed, extending basally. Proximal to these is a transverse row of four asperites immediately anterior to the spinose annulus. Some 3-7 setae occur on the lateral margin of the epipharynx. Pternotorma shallow.

(d) *Syndesus cornutus* (Fig. 9). Mesal anterior projection extends to about the middle of the annulus. Distal sensory area has an anterior transverse row of four strong pointed spines and four asperites on anterior portion of the annulus. Pternotorma moderately keeled. Some three setae occur on the lateral margin of the epipharynx.

ANTENNAE

Antennae are three-segmented. First segment long, narrow basally, swollen distally with a few setae. Second segment clavate, with or without setae and sensory spots. Terminal segment

small, cylindrical, pointed apically, with one seta on the apex and one on each side.

(a) *Lamprima varians* (Fig. 10). Some four setae occur on the first segment. Second segment somewhat up-curved and pointed apically below the terminal segment; devoid of setae and sensory spots.

(b) *Lissapterus howittanus* (Fig. 11). Some 4-5 setae occur on the first segment and 14-16 sensory spots on the third segment. Terminal segment with four setae; one seta on the dorsal aspect and one on each side. Fourth seta situated medially, apically.

(c) *Lissotes furcicornis* (Fig. 12). Generally more setaceous, having some 12 setae on the first segment and numerous, fine, bristle-like setae on the third segment.

(d) *Syndesus cornutus* (Fig. 13). First segment with 4-5 setae. Second segment devoid of setae and sensory spots.

TARSUNGULUS

(a) *Lamprima varians* (Fig. 14). Legs without distal claw, terminal segment somewhat bulbous, densely covered with setae.

(b) *Lissapterus howittanus* (Fig. 15). Legs terminate with a slightly curved, elongate, blunt claw; one seta situated ventrally behind the apex and another seta situated laterally forward of the middle of the claw.

(c) *Lissotes furcicornis* (Fig. 16). Legs terminate with a moderately curved, pointed claw, broad basally; one seta present on each side near the base.

(d) *Syndesus cornutus* (Figs. 17-18). Legs terminate with a somewhat elongate tubercle which has a small cusp at the middle, apically and one seta on each side of the cusp.

ANAL SEGMENTS

(a) *Lamprima varians* (Fig. 19). Anal pads which together are cordi-

form, with numerous short fine bristles on the upper surface, decreasing in number on the lower surface. Dorsal anal lobe small and devoid of setae. Raster with very short septula, with a patch of short, fine setae situated ventrally on each side of anal pads.

(b) *Lissapterus howittanus* (Fig. 20). Anal pads ovate and inflated (slightly concave on inner margin on odd specimens). Ventral and lobes with a patch of short, stout, downward-directed setae. Dorsal anal lobe small, devoid of setae. Raster with a long, straight, open septula, extending into the campus, with a dense patch of short, stout, compressed setae on each side, extrorse, set at about 45° angle.

(c) *Lissotes furcicornis* (Fig. 21). Anal pads ovate. Ventral anal lobe with a patch of somewhat short, stout, setae, extrorse. Dorsal anal lobe slightly inflated. Septula wide, inverted V-shaped for about half the length of the segment. Upper half in region of campus, somewhat V-shaped.

(d) *Syndesus cornutus* (Fig. 22). Tri-lobed, with lobes distinctly inflated. Anal pads ovate. Dorsal anal lobe with distinct almost ovate pad. Ventral anal lobes devoid of setae. Raster with numerous, short, introrse setae and narrow septula extending to, and closed, just beyond the middle of the segment.

STRIDULATORY ORGANS

These are not described but are illustrated in Figures 23-26.

Acknowledgements

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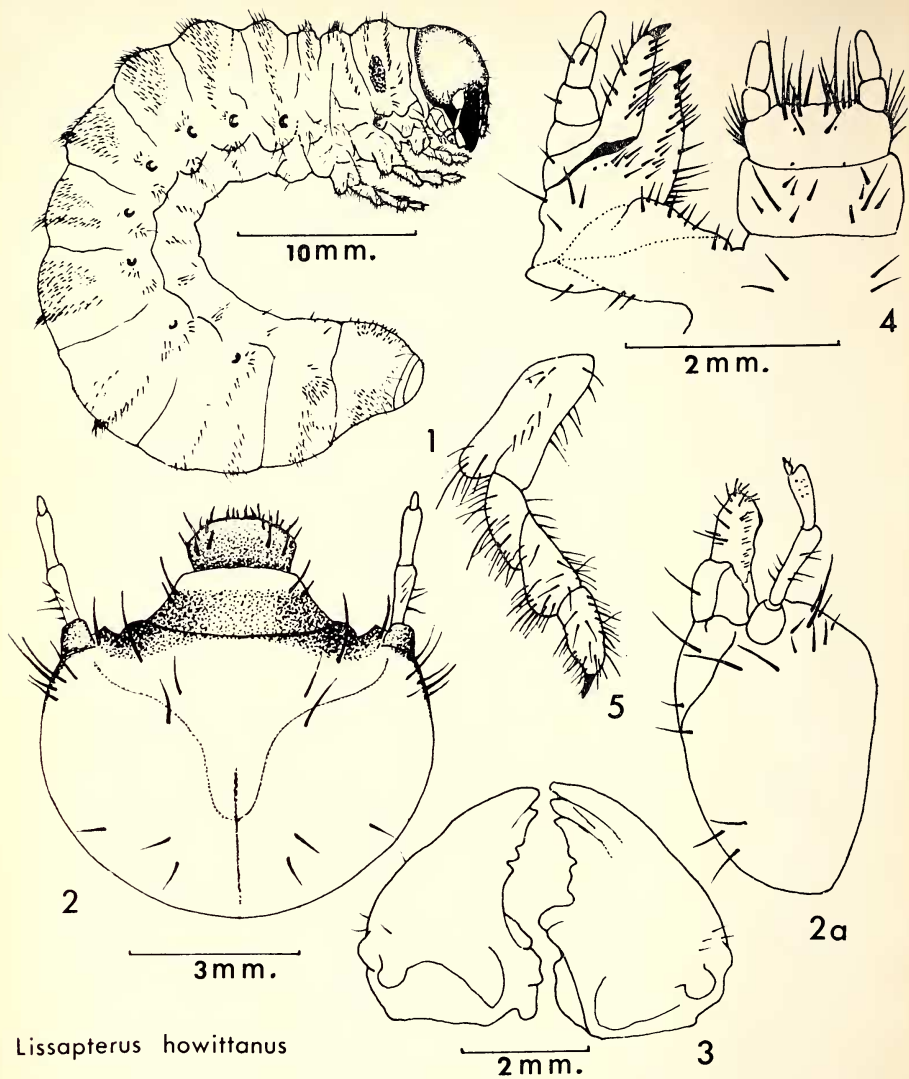


Plate I

Mature larvae of *Lissapterus howittanus*.

Fig.

1. Lateral view of larvae.
2. & 2a. Head — dorsal and lateral view.
3. Mandibles — lateral view.
4. Right maxilla and labium ventral view.
5. Leg.

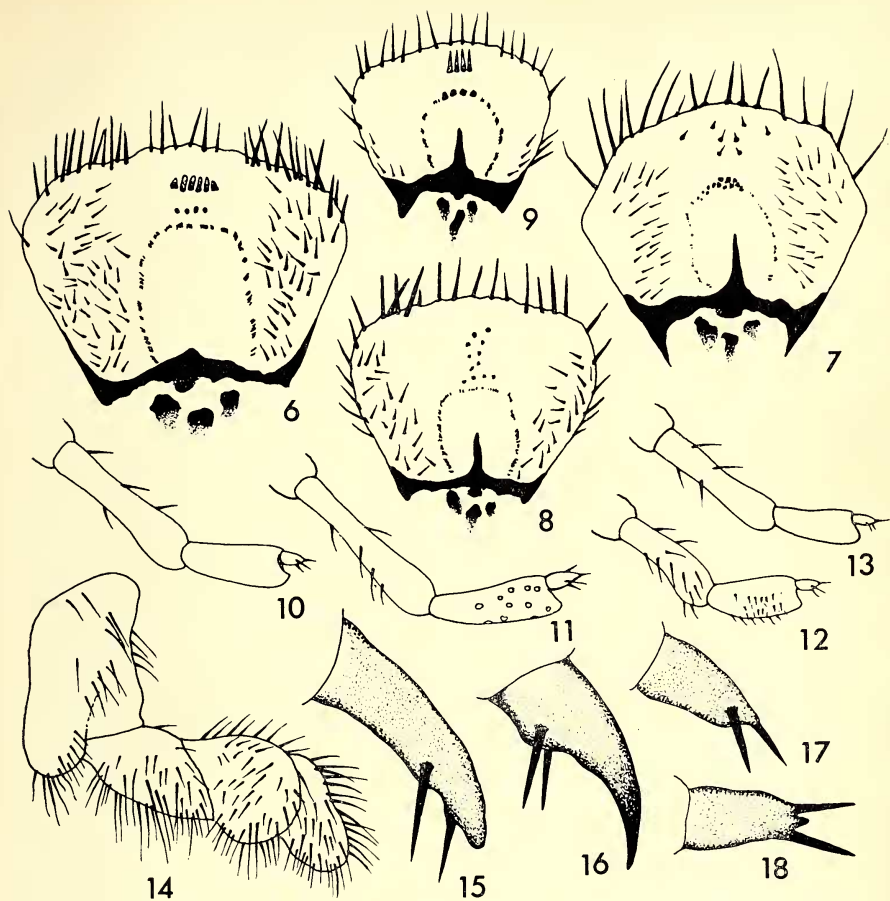


Plate II

Epipharynges.

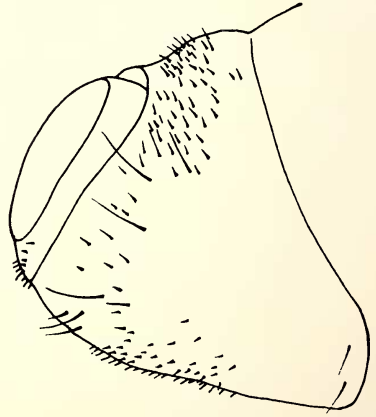
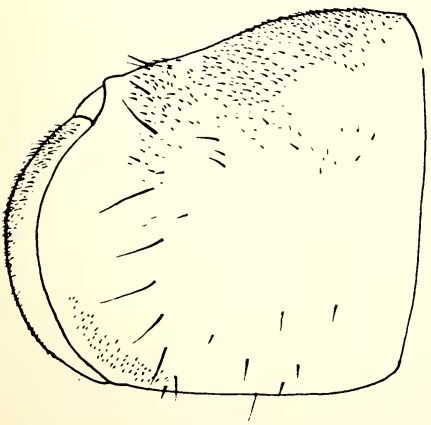
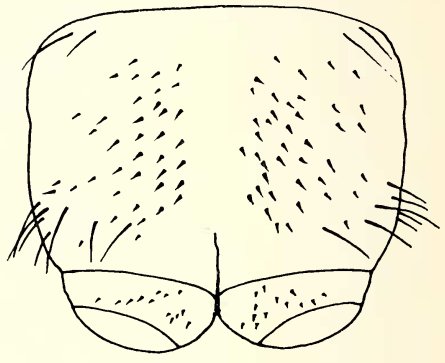
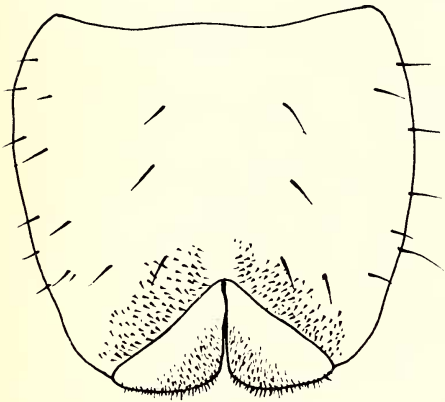
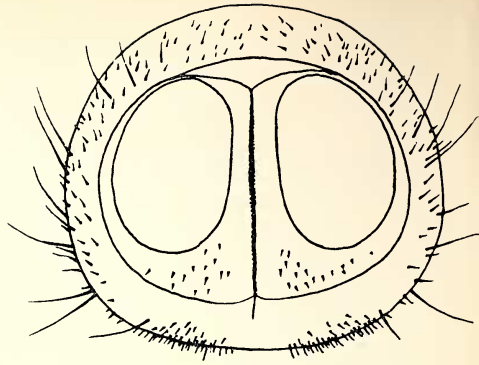
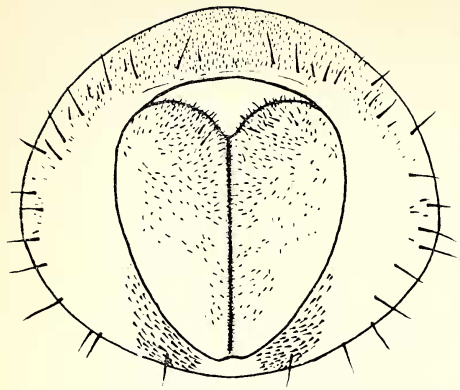
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| Fig. 6. | <i>Lamprima varians</i> . | 7. | <i>Lissapterus howittanus</i> . |
| 8. | <i>Lissotes furcicornis</i> . | 9. | <i>Syndesmus cornutus</i> . |

Antennae.

- | | | | |
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| Fig. 10. | <i>Lamprima varians</i> . | 11. | <i>Lissapterus howittanus</i> . |
| 12. | <i>Lissotes furcicornis</i> . | 13. | <i>Syndesmus cornutus</i> . |

Tarsungulus.

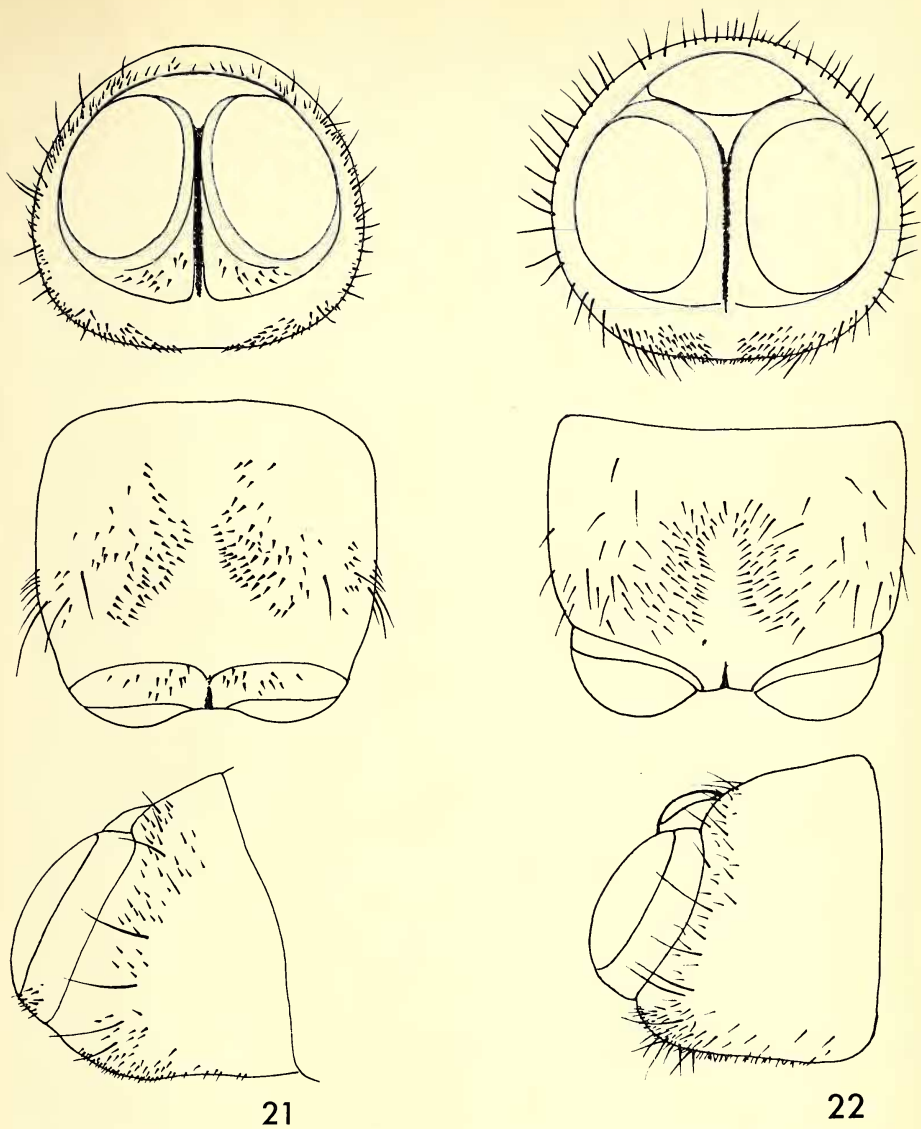
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| Fig. 14. | Leg of <i>Lamprima varians</i> . |
| 15. | Claw of <i>Lissapterus howittanus</i> — lateral view. |
| 16. | Claw of <i>Lissotes furcicornis</i> — lateral view. |
| 17-18. | Segment of <i>Syndesmus cornutus</i> — lateral and dorsal view. |



19

20

Plates III & IV



Anal segments — posterior, ventral and lateral views respectively.

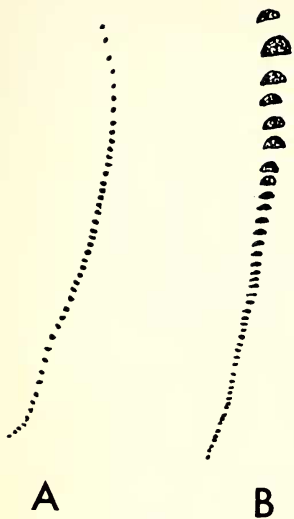
Fig.

19. *Lamprima varians*.

20. *Lissapterus howittanus*.

21. *Lissotes furcicornis*.

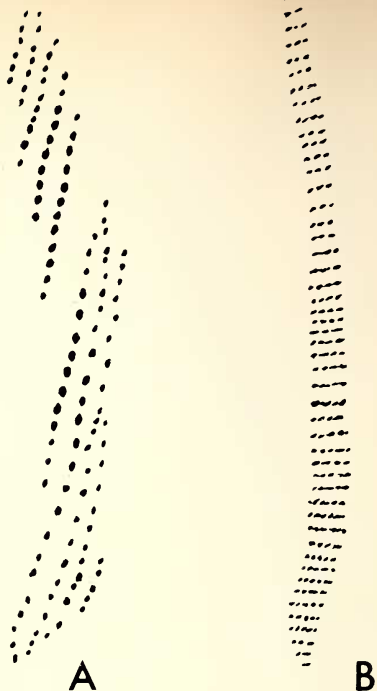
22. *Syndesus cornutus*.



A

B

23



A

B

24

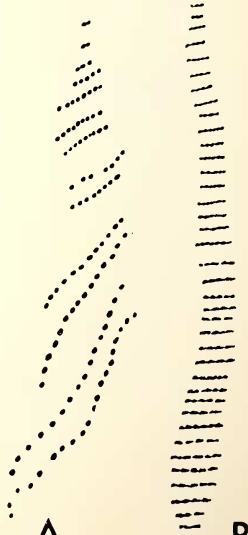


A



B

25



A

B

26

Plate V

Stridulatory organs — mesothoracic and metathoracic legs respectively.
 23. *Lamprima varians*.
 25. *Lissotes furcicornis*.
 24. *Lissapterus howittanus*.
 26. *Syndesus cornutus*.

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(Continued from page 70)

species often have common names with zoological twist, such as *D. maculata* (Leopard Orchid), *D. sulphurea* (Tiger Orchid), *D. pedunculata* (Snake Orchid or Golden Moths), and *D. longifolia* (Donkey Orchid in W.A., but Wallflower Orchid in Victoria). The generic name is used as a common name sometimes, with a qualifying adjective, such as *D. punctata* (Purple Diuris, White Diuris or Long Double-tails).

***Dolichos.** Gk dolichos, long; used by the Greeks for long-podded beans, hence transferred to these climbing plants closely related to beans. Our species, **D. lignosus*, is not native, nevertheless it is known in America as Australia-pea Dolichos; it is Common Dolichos here.

Drabastrum. Draba, name of a cruciferous genus (from Gk drabe, the clas-

sical name for *Cardaria draba*); -aster, -astrum, Lat suffix for a diminutive, often used in a pejorative or derogatory way (cf. poetaster, a poor poet). *D. alpestre*, our species, is Mountain Cress.

Drimys. Gk drimys, acrid, pungent; from the taste of the bark and the peppery leaves. Our species, *D. lanceolata*, Mountain Pepper, was once *Winterania* and is now *Tasmannia*. It is in family Winteraceae.

Drosera. Named by Linnaeus from Gk droseros, dewy (drosos, dew); referring to the clear, shining, dew-like drops of secretion on the leaf-glands. Adanson's name for the genus was *Ros-solis* (literally dew of sun, i.e. sundew). Victoria has nine species, all native, known as various kinds of sundew.

To be continued